proximate geometrical progression, being twice as great in spring as in summer, twice as great in autumn as in spring, and twice as great in winter as in autumn. In a London winter there are more days without sunshine than with it.

The values for the entire year show that the average number of hours of bright sunshine is 1214, or 27 per cent. of the possible amount. The largest number recorded in any year of the fourteen was in 1887, when there were 1407, while the smallest was in that notoriously dismal year 1879, when there were only 984. Taking the year through, the average daily amount of sunshine at Greenwich is little more than three hours and a quarter, or less than half the quantity possible on the shortest December day. Thus, if the sun were to shine all the year through for the same number of hours as the highest possible in mid winter, we should get twice as much bright weather as we actually experience; and the results of an average of fourteen years' observations show that there are 94 days out of the 365, or more than a fourth of the year, upon which the solar rays are either altogether absent or are too feeble to leave any mark on the recording instrument.

FREDK. J. BRODIE.

## *NOTES.*

AT a meeting of the Academy of Sciences held in Paris on Monday, the 2nd inst., Mr. Archibald Geikie, F.R.S., Director-General of the Geological Survey of the United Kingdom, was elected Correspondent of the Institute of France.

ON March 1 a meeting was held in the large hall of the Berlin Rathhaus to do honour to the memory of Dr. Schliemann. The meeting was summoned by the Geographical, the Anthropological, and the Archæological Societies of Berlin. Profs. Virchow and Curtius were the chief speakers, and they eulogized the character and achievements of the famous explorer and archæologist.

THE office of Colonial Bacteriologist at the Cape of Good Hope, has been offered to Dr. Edington of the University of Edinburgh.

REPLYING to Mr. John Ellis in the House of Commons, on Tuesday, Mr. Plunket said that the official guide to the Royal Gardens at Kew, which was at present out of print, was under revision. During the last two years the changes consequent on the rearrangement of the collections had been so extensive, that it had been thought better to suspend the publication of the guide, as in such a period of transition it would mislead, and be a cause of disappointment. Now that the rearrangement of the collections was nearing completion, a new guide had been put in hand, and Mr. Thiselton Dyer hoped to have it ready by next summer.

WE regret to have to record the death of Mr. George Bertin, who was well known as an able and learned student of Assyriology. He died on February 18, in his forty-third year.

PROF. VICTOR HORSLEY will give a discourse at the Royal Institution on "Hydrophobia," on Friday, March 20, in place of Prof. W. E. Ayrton, who is unable at present to give his promised lecture on "Electric Meters, Motors, and Money Matters."

ON Friday last, Mr. Goschen received a numerous deputation representing the University Colleges of England, who presented a memorial in favour of the annual grant, which is now £15,000, being increased. The deputation was introduced by Mr. Chamberlain, who, with Mr. Mundella, Sir Henry Roscoe, and others, strongly supported the memorial. Mr. Goschen, in the course of his reply, said they would not expect him without consultation with his colleagues, or at once after the reception of a deputation such as that, to give any final answer, but he was disposed to admit that in many ways they had made out a strong case. At all events they had made out this case, that the Colleges had been doing an increased good work, and that they thought that with additional sums they would be able to widen still the area of their usefulness. One point had struck him while the discussion was going on—and he might some time discuss it with Mr. Chamberlain, who would be a good authority on the question—namely, whether, instead of relations being established between the Imperial Government and these Colleges, it would not be better that the tie should exist between the County Councils and the Colleges, which would stimulate local interest. That was a matter which was too wide for discussion then; but he threw out the idea, in case it should become at any time the subject of their future consideration. It might be that the County Councils would throw their hearts into this work, as he believed they were doing in many parts of the country into the question of technical and other education, and for his part he should see no objection to any course that would tend to increase local interest in these Colleges.

IN several journals attention has lately been called to the fact that for women there exists at the present moment at Bedford College the very facilities for study which University College and King's College propose to offer when the present scheme for the development of their scientific teaching is carried out. Bedford College, one of the earliest established for women only, was founded as long ago as 1849; and when the University of London admitted women to its degrees, Bedford College students were the first to graduate there, while of those women who have since taken degrees in arts and science, a large proportion have belonged to the same institution. A new wing has just been added to the College, so that four separate laboratories are now open daily for the use of women desirous of carrying on practical work in biology, botany, chemistry, or physics. Special advantages are provided for those who have any bent for higher work or for original research. As the public opening of the new wing has been unavoidably postponed, the Council of the College desire it to be known that since Easter, 1890, the new laboratories have been in full working order, and that they can now offer accommodation to a greatly increased number of women students.

AT a meeting of the Biological Society of Washington, on February 7, Mr. Charles D. Walcott, of the U.S. Geological Survey, announced the discovery of vertebrate life in the Lower Silurian (Ordovician) strata. He stated that "the remains were found in a sandstone resting on the pre-Palæozoic rocks of the eastern front of the Rocky Mountains, near Canon City, Colorado. They consist of an immense number of separate plates of placoganoid fishes, and many fragments of the calcified covering of the notochord of a form provisionally referred to the Elasmobranchii. The accompanying invertebrate fauna has the facies of the Trenton fauna of New York and the Mississippi valley. It extends into the superjacent limestone, and at a horizon 180 feet above the fish beds seventeen out of thirty-three species that have been distinguished are identical with species occurring in the Trenton limestone of Wisconsin and New York. Great interest centres about this discovery from the fact that we now have some of the ancestors of the great group of placoderm fishes which appear so suddenly at the close of the Upper Silurian and in the lower portion of the Devonian groups. It also carries the vertebrate fauna far back into the Silurian, and indicates that the differentiation between the invertebrate and vertebrate types probably occurred in Cambrian time." Mr. Walcott is preparing a full description of the stratigraphic section, mode of occurrence and character of the invertebrate and vertebrate faunas, for presentation at the meeting of the Geological Society of America, in August next.

A SOCIETY for the Study of the Flora of France has been instituted by M. Camus, of Paris, and M. Magnier, of Saint-Quentin (Aisne), somewhat on the lines of our Botanical Exchange Club. Its special object is the distribution of authentic specimens of rare and critical species, remarkable varieties, and hybrids.

THE State of Dakota has established a Botanical Experiment Station at Fargo, under the charge of Mr. Henry L. Bolley, of the Indiana Experiment Station.

WE learn from the *Botanical Gazette* that Dr. J. T. Rothrock had arranged a biological expedition to the West Indies and Yucatan, and was to spend the months of November, December, and January in those countries. The party was provided with an excellent ship with abundant storage room. Mr. A. S. Hitchcock was to accompany the expedition in the interests of the Missouri Botanical Garden.

THE fifth Annual Report of the Ornithological Observation Stations in the kingdom of Saxony has been issued. It is edited by Dr. A. B. Meyer and Dr. F. Helm. The Report records the observations made in the year 1889 by 47 observers at 45 stations, on 209 species of birds.

MR. G. J. SYMONS, F.R.S., writing to the *Times*, from 62 Camden Square, N., speaks of the extraordinary dryness of the month of February. He says:—"My observations here have been absolutely continuous for more than thirty years, and hitherto the driest February was that of 1863, when 0·31 inch fell. In 1891 we have less than one-thirtieth of that; we have only 0·01 inch. And if we examine all the other months of the whole thirty-three years we find that the driest was May 1885, with 0·26 inch. These two facts sufficiently indicate the exceptional character of the past month at this station. We had one slight sprinkle in the forenoon of February 7, immediately after one of those intense darknesses (arising from high fog) which are becoming so sadly more frequent in this wilderness of chimneys. It had been dark—actually darker than on a clear moonless night. Fine mist began to fall. I put some sheets of note paper in the garden for the rain to fall upon. The shower, if such it could be called, was over in an hour, and every drop had left its inky mark upon the paper. I inclose a portion that you may have one more proof of the need for drastic measures if London is to be clean enough to live in." Mr. Symons has received only one return from England exceeding 0·10 inch, and this was from the hills above Ullswater.

A BILL introduced into the House of Lords by Lord Stratheden and Campbell for the abatement of the smoke nuisance in London was read a second time on Monday, and afterwards referred to a Committee. On the same evening, in the House of Commons, Viscount Wolmer asked the First Lord of the Treasury whether, considering the serious injury to health, the disturbance of business, and the hardships inflicted on many of the poorest wage-earners of the metropolis by the curtailment of their working hours, caused by the increasing prevalence of fogs, Her Majesty's Government would consider the advisability of appointing a Royal Commission to examine and report how far the evil was one which could be mitigated by legislation. Mr. W. H. Smith replied:—"I have to assure my noble friend that Her Majesty's Government are, in common with other inhabitants of the metropolis, extremely sensible of the serious injury, disturbance, and hardship inflicted by the increasing prevalence of fog. They are, however, sceptical of the value of a Royal Commission to investigate the subject. It is notorious that the evil mainly arises from the smoke emitted by ordinary domestic fires, and the problem to be solved is, whether it is possible by legislation to prohibit and prevent the production of smoke in this way. A Bill was introduced into the House of Lords in 1887 with this object, and was referred, after a second reading, to a Select Committee, which took evidence that went to show that smoke could be prevented by the use of non-bituminous coal, by the substitution of coke or gas for coal for heating purposes, and possibly by the adoption of an improved grate, and by great care in the lighting and feeding of fires in the metropolis. The Bill was not proceeded with beyond the Committee stage of 1887. Another Bill has been introduced with the same object, and stands for second reading in the House of Lords this evening. If it should come down to this House, the noble lord will have an opportunity of considering whether it is possible by penalty on occupiers of houses and tenements to secure the object he has in view." Sir H. Tyler had a question on the subject of an inquiry into the various descriptions of coal used in the metropolis. Mr. W. H. Smith said the matter had already had attention from a Committee of the House of Lords, and he doubted whether it would be possible to carry it further.

*Ciel et Terre* of February 16 contains an article by A. Lancaster, of the Brussels Observatory, on the severe frosts of this century. He has examined the statistics with the view of finding some clue to the probable future weather, and finds: (1) that a cold winter has never been followed by a very hot summer; and (2) that in the great majority of cases the summer following a severe winter has been cold. The same opinion has been expressed by Humboldt in his *Cosmos*, and by others. M. Lancaster concludes from the comparisons he has made that there is a great probability of a cold summer this year, and that June and July particularly will have a low temperature. Further, that as every prolonged period of cold in summer coincides with rainy weather, we may expect a wet summer. In support of this opinion he quotes the fact that out of fifteen cold winters between 1833-90 all but two have been followed by wet summers.

THE Government have chartered the steam yacht *Harlequin*, 160 tons, for fishing-experiments off the Irish coast. She will be in commission three months. She has a powerful electric search light, and her steam appliances include a winch capable of lifting a 7-ton trawl.

A TELEGRAM from Washington says it has been decided that the Arctic Expedition under the command of Civil Engineer Peary, of the United States Navy, will leave Inglefield Gulf, on the west coast of Greenland, and take a north-easterly course by sledges. The party will consist of picked men, and will start from New Bedford, Massachusetts, on May 1. The scientific and geographical Societies of the United States will defray the expenses.

THE Journal of the Camera Club, vol. iv., Nos. 40-52, for the year 1890, contains many articles that will be read with interest by photographers, both amateur and professional. Among them we notice those on the density of negatives, on pin-holes, &c., by Captain Abney; limitations in the treatment of subjects, practical interpretation of the law of conjugate foci, by T. R. Dallmeyer; eclipse photography, by A. A. Common; photography by the light of the electric spark, by Lord Rayleigh. Besides these, there are many notes, reviews of books, and accounts of excursions made to various places of note for the purposes of photography, and several other items of photographic news. Illustrations of the new premises that are being specially built for the Club are given, showing plans of the various floors, and from them we see that ample provision is being made for the requirements of photography in the form of dark rooms, studios, enlarging rooms, and rooms for meeting. In this volume, also, is inserted a very pretty illustration, entitled "Twitch Burning," the print being by the Praphstone Company, Limited.

It is commonly believed that the aboriginal Aino race, inabiting the Island of Yezo in Northern Japan, is rapidly dwindling away before the advance of civilization. But, according to the information lately published in Japan, this popular belief does not appear to be altogether corroborated by facts. Under the old Japanese *régime*, the population of Yezo emigrants from the other Japanese islands was estimated at 40,000, but in consequence of protection and encouragement given by the reformed Government, this number increased to 350,000 in 1888. As a natural consequence, the Ainos' means of sustenance were encroached upon, and they have been popularly believed to be going down before the advance of the dominant race. But the latest statistics show that the truth is far from the common hypothesis, and that this curious and interesting race is not dying out, as has been supposed. The exact figures are as follows :—

*Aino Population in Yezo.*

| Year. | Male. | Female. | Total. |
|---|---|---|---|
| 1872 | 7964 | 7311 | 15,275 |
| 1873 | 8167 | 8032 | 16,199 |
| 1874 | 8171 | 8160 | 16,331 |
| 1875 | 8547 | 8583 | 17,130 |
| 1876 | 8579 | 8598 | 17,177 |
| 1877 | 8483 | 8483 | 16 966 |
| 1878 | 8537 | 8521 | 17,058 |
| 1879 | 8513 | 8515 | 17,028 |
| 1880 | 8566 | 8575 | 17,141 |
| 1881 | 8476 | 8457 | 16,933 |
| 1882 | 8546 | 8652 | 17,198 |
| 1883 | 8617 | 8615 | 17,232 |
| 1884 | 8702 | 8770 | 17,472 |
| 1885 | 8635 | 8687 | 17,322 |
| 1886 | 8464 | 8571 | 17,035 |
| 1887 | 8437 | 8525 | 16,962 |
| 1888 | 8475 | 8587 | 17,062 |

Messrs. **Cassell** have published the first part of what promises to be a book of considerable value. The work is entitled "Our Own Country," and will present, with illustrations, a geographical and historical description of the chief places of interest in Great Britain and Ireland. The same publishers have just issued the first part of a work on "Familiar Trees," by G. S. Boulger, with 80 coloured plates ; and Part 29 of their excellent "New Popular Educator."

A work entitled "Memorials of John Gunn" will shortly be issued. It will be edited by Mr. Horace B. Woodward, and will contain notes by the late Mr. Gunn, presenting some account of the Cromer forest bed and its fossil Mammalia, and of the associated strata in the cliffs of Norfolk and Suffolk. Mr. Gunn, while acting as a country clergyman, had for many years devoted a large share of his attention to the geology of Norfolk. The "Memorials" will be accompanied by a portrait and biographical sketch of the author.

The following lectures will be given at the Royal Victoria Hall : March 10, Mr. J. E. Flower on "Spain" ; 17th, Mr. A. W. Clayden on "Thunderstorms" ; 24th, Prof. Roger Smith on "St. Paul's."

Prof. Seubert contributes an important paper to the current number of *Liebig's Annalen*, in which are presented the final results of his redetermination of the atomic weight of osmium. A preliminary account of the earlier portion of this work was published in the *Berichte* in June 1888, and a short notice concerning it was given in these columns (vol. xxxviii. p. 183). It was then shown that the atomic weight of osmium was certainly not higher than 191, and was probably a few decimals less. Owing, however, to lack of material, Prof. Seubert was not able to complete the work in the unimpeachable manner characteristic of his other atomic weight determinations. Since that time, however, thanks to the kindness of Prof. Lothar Meyer, a sufficient quantity of pure osmium has been placed at his disposal, and the work has been completed in a manner which leaves nothing to be desired. The salts analyzed were potassium and ammonium osmium chloride, $K_2OsCl_6$ and $(NH_4)_2OsCl_6$. The final mean value derived from all the experiments is 190·3, a number which fully justifies the expectations of Prof. Seubert that it would fall slightly below 191. The importance of the settlement of this question cannot be over-rated, for it removes the last outstanding exception to the periodic generalization. The metals of the platinum group—osmium, iridium, platinum, and gold—when arranged in the order of their chemical and physical properties unmistakably take the relative precedence just quoted. If these properties are, as everyone now agrees, periodic functions of atomic weight, the atomic weights of these metals should increase from that of osmium upwards to that of gold. Previous to the year 1878, however, the accepted atomic weights were : gold 196·2, iridium 196·7, platinum 196·7, and osmium 198·6—a relation which, if correct, was diametrically opposed to the principle of periodicity. In that year Seubert attacked the subject, and the first outcome of his labours was to correct the atomic weight of iridium, which he found to be 192·5, instead of 196·7. It was a most remarkable tribute to the accuracy of Seubert's work, and likewise of his own, that Joly a short time ago obtained for the same constant the identical number, 192·5. In 1881, Seubert took up the case of platinum, and finally adjusted its atomic weight to 194·3—a number which was confirmed by a subsequent determination of Halberstadt. In 1887 the position of gold was finally decided by the remarkably agreeing and almost simultaneous determinations of Thorpe and Laurie on the one hand, and Krüss on the other, the value arrived at in both cases being practically 196·7. Finally, we have the just completed work of Seubert upon osmium ; and the four metals, when arranged in order of atomic weight, now take the order : osmium 190·3, iridium, 192·5, platinum 194·3, gold 196·7—an order of precedence in full accord with the order of their chemical and physical properties.

The additions to the Zoological Society's Gardens during the past week include a Red-throated Diver (*Colymbus septentrionalis*), British, presented by Mr. E. J. Gale ; a Herring Gull (*Larus argentatus*), British, presented by the Rev. C. A. Berry ; twelve Grayling (*Thymallus vulgaris*) from British fresh-waters, presented by Messrs. Howard L. Cooper and — Jukes ; a Wapiti Deer (*Cervus canadensis* ♂) from North America, a Long-tailed Weaver Bird (*Chera progne*) from South Africa, two Chinese White-Eyes (*Zosterops simplex*) from China, deposited ; four Upland Geese (*Bernicla magellanica* ♂ ♂ ♀ ♀) from the Falkland Islands, purchased ; a New Zealand Parrakeet (*Cyanorhamphus novæ-zealandiæ*) from New Zealand, two Wonga-Wonga Pigeons (*Leucosarcia picata*) from New South Wales, received in exchange ; a Gayal (*Bibos frontalis*), born in the Gardens.

## OUR ASTRONOMICAL COLUMN.

The Permanence of Markings on Venus.—In *Bulletin No. 12 de l'Académie Royale des Sciences de Belgique*, Dr. Terby contributes a paper entitled, "Facts demonstrating the permanence of the dark spots on Venus, and the slowness of their motion of rotation." Dr. Terby made a series of observations of Venus between April and August 1887, and sent some of the results, in a sealed packet, to the Academy in the same year. A similar series of observations was made by M. Perrotin from May to September 1890, and the results were communicated to the Paris Academy (*Comptes rendus*, October 27, 1890). The object of the present paper is to call attention to the fact that the drawing made by M. Perrotin in 1890 agrees in every respect with those made by Dr. Terby in 1887. Each observer made drawings of two types of markings, and in each case the change from one type to the other took place about two months